A. G. ANDERSON.

METHOD OF MAKING METAL WHEELS.

APPLICATION FILED SEPT. 11, 1907.

903,532. Patented Nov. 10, 1908.

Fig. 1.

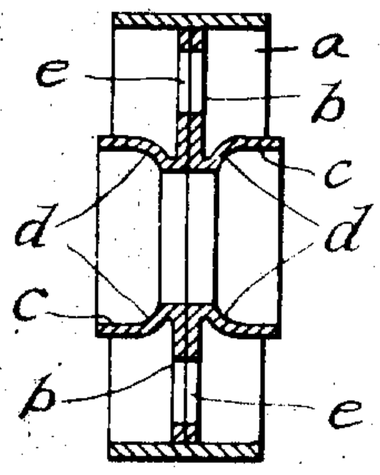


Fig. 2.

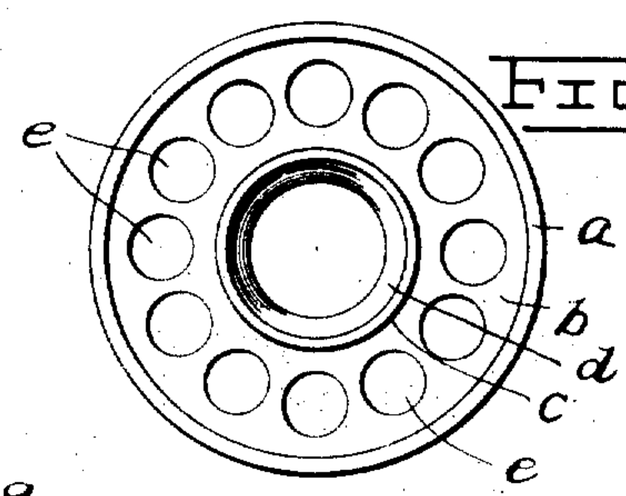


Fig. 3.

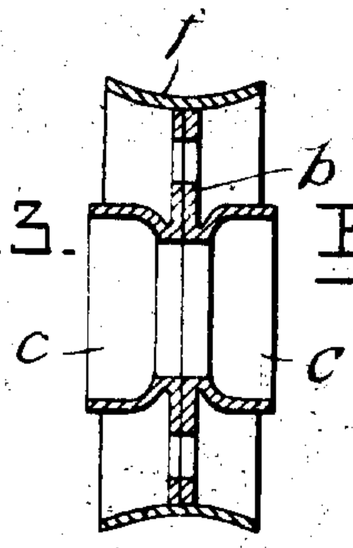


Fig. 4.

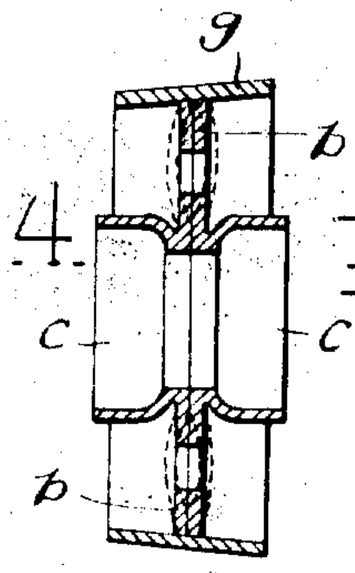


Fig. 5.

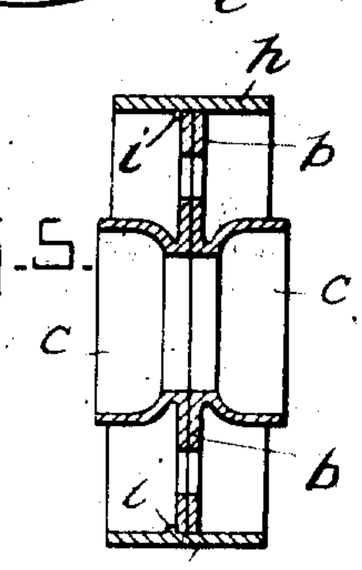


Fig. 6.

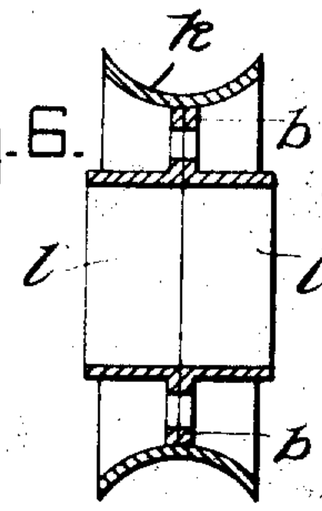


Fig. 7.

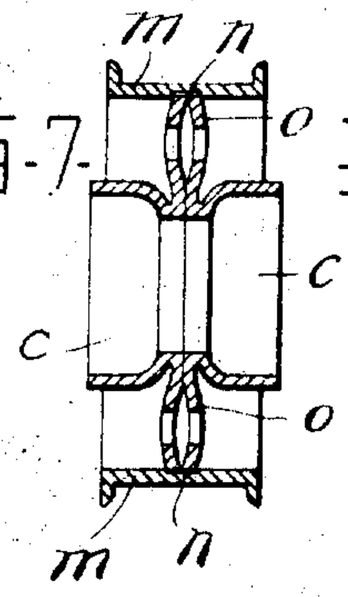


Fig. 8.

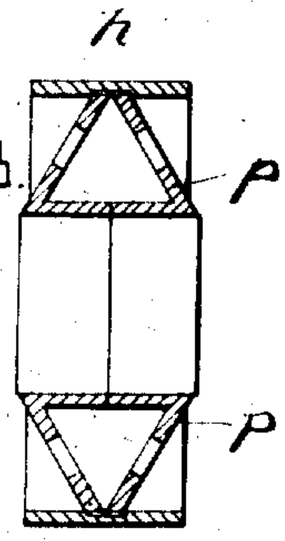


Fig. 9.

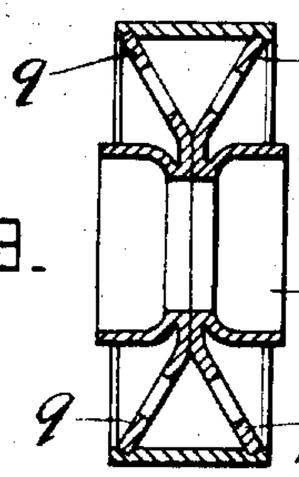


Fig. 11.

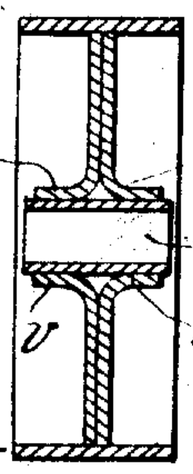
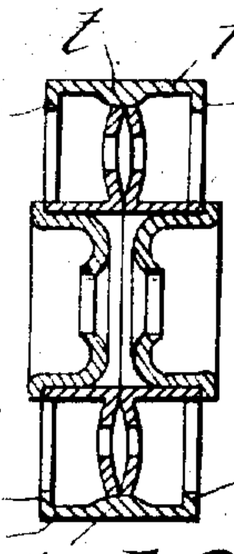


Fig. 10.



Witnesses

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P. S. Tucker.

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By Howard A Coombs

his Attorney

UNITED STATES PATENT OFFICE.

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METHOD OF MAKING METAL WHEELS.

No. 903,532. Specification of Letters Patent. Patented Nov. 10, 1908.

Application filed September 11, 1907. Serial No. 392,352.

To all whom it may concern:

Be it known that I, ANDERS G. ANDERSON, a citizen of the United States, residing at the corner of North and Barber avenues, Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Methods of Making Metal Wheels, of which the following is a specification.

My invention relates to improvements in methods of making metal wheels, and is designed to simplify and cheapen the production of such articles, while detracting nothing from their strength or durability.

By my method of construction, I produce an improved article which is peculiarly adapted for efficient use as a wheel for roller-skates but is also applicable for use as a pulley, or for other purposes where a very strong and, at the same time, economical wheel is desired.

The article, which for the sake of convenience I will hereinafter designate throughout as a "wheel", is composed essentially and in its preferred form, of only three parts, two of which are identical and are each formed of steel pressed in dies to form a web-and-hub member, the hub portion of which may be shaped to form a ball-race when the wheel is to be mounted on ball-bearings, the third part being the rim-member, which is drawn or pressed up from soft steel. This rim-member may be a plain cylindrical ring, or dished to receive a belt, and it may be crowned or tapered, and internally grooved or shouldered to facilitate the assembling, as will be hereinafter described. The web-and-hub members may also take various forms; for instance the web-portion may be in a plane at right angles to the axis of the hub-portion or in a plane inclined thereto in either direction; the hub-portions may be cylindrical throughout or shaped to form or receive ball-races and the web-members may be made dish-shaped so that they are expanded in the operation of assembling. The method of assembling the parts also necessarily varies somewhat in accordance with the shapes of the latter, as will be seen from the description which follows, taken in connection with the accompanying drawing, in which,

Figure 1 is a cross-section of a wheel embodying my improvements; Fig. 2 is a side elevation of the same; this figure will also serve as an elevation of the modified forms of the other views; Figs. 3, 4 and 5 are sectional views, similar to Fig. 1, illustrating slightly modified rims to facilitate assembling the parts; Fig. 6 is a similar view illustrating modified forms of the rim and hub; Fig. 7 is a similar view illustrating another modified form of rim and also a different method of assembling the parts; Figs. 8 and 9 are similar views showing modified forms of the rim member, the hub portions of the web-and-hub members being cylindrical with ball-races pressed therein, and Fig. 10 is a view showing a modified form of wheel, in which the ball-races are made separate from the web-and-hub members. Fig. 11 illustrates a wheel having a straight cylindrical hub pressed into flanges formed on the web-members.

In Fig. 1, the rim-member *a* is a plain, cylindrical ring drawn up of soft steel of a diameter slightly greater than that of the webs *b* of the web-and-hub members; said webs lie in planes at right angles to the axis of the wheel, and carrying integral hub-portions *c* shaped to form ball-races at *d*. These web-and-hub members are each made from a disk of steel, which is cupped and pressed in dies to shape; the sharp edge of the disk, where it is cut from the plate, is left on the hub-side, for a purpose to be described. The web-and-hub members, which are identical in shape, are now placed back-to-back with the web-portions in contact, the rim member is placed centrally around the webs and the parts thus assembled are forced through a die which compresses the rim tightly onto the webs, the edges of which bite into the metal of the rim, thus making a joint as strong as though the parts were integral or welded. The sharp edges of the webs, above referred to, assist in this operation and crowd the two web-portions tightly together. The web-and-hub members are preferably case-hardened while the rim-member is left soft.

For the sake of lightness, the webs may contain a series of apertures *e*, as clearly shown in Fig. 2, which, as has been stated, will serve as a side elevation for all the different forms of the wheel shown in the drawing.

In Fig. 3, the rim-member *f* is slightly cupped or dished and is assembled with the web-and-hub members by compressing it in

dies which straighten it out and thereby force it onto the edges of the webs *b*.

In Fig. 4, the rim-member *g* is first drawn taper, being made truly cylindrical in the operation of assembling the parts. The taper is such that it prevents the webs from displacement in assembling. The webs may be simultaneously expanded by straightening them.

In Fig. 5 the rim-member *h* is provided with an internal shoulder *i*, against which the webs are placed when the parts are to be assembled. The shoulder serves as a gage to locate the webs centrally in the rim, and may be combined with the tapered or cupped rims of Figs. 3 and 4.

In Fig. 6 a form of rim *k* is shown, suitable for the reception of a belt, showing the adaptability of my invention to pulleys. Also the hubs *l* are made plain, the ball-races being omitted.

In Fig. 7 another form of belt-pulley rim *m* is shown and further as having an internal groove *n* for the reception of the edges of the webs *o* which are dished, as shown, the assembling being accomplished by straightening said webs and thereby expanding them into said groove.

Fig. 8 illustrates a modified form of the web-and-hub members, in which the web-portions *p* spring from the outer ends of the hub-portions instead of from the inner ends as heretofore, and are inclined inwardly to meet at the center of the rim, which, in this case, is compressed onto the webs and is preferably grooved, as shown.

In Fig. 9, the web-portions *q* are inclined outwardly from the inner ends of the hub-portions and engage the rim near its outer edges. The rim here also is compressed onto the webs.

In Fig. 10, I have shown, as an example of the various forms in which my invention may be embodied and which are naturally too numerous to illustrate and describe, a rim-member *r* having downwardly extending flanges *s* and a thicker portion *t* at its center. The webs may be dished, as shown, and expanded into said thickened portion, which may or may not be grooved, or the webs may be straight and the rim be compressed onto the same, or the two operations may be combined, as indeed is also the case whatever the shape of the rim may be, provided the webs are not inclined as in the forms of Figs. 8 and 9. In this Fig. 10, I have shown straight hub-portions with ball-races *u* pressed in, but it will be obvious that they might equally well be shaped to form integral ball races.

In the form shown in Fig. 11, the web members have short hub-members or flanges *v* formed thereon, and a straight cylindrical hub *w* is pressed therein.

As will be seen from the foregoing, there are numerous slight modifications which may be made in the shape of the rim, in that of the web-and-hub members and in the method of assembling the parts, and it will be understood that the said modified forms may be combined in various ways in addition to those illustrated in the drawing, and that the different methods of assembling the parts may be used at will with the various shapes, excepting, of course, where the latter do not lend themselves to certain of the methods of assembling hereinbefore described, the scope of my invention being defined in the following claims:—

1. The method of making a metal wheel of the class described, which consists in pressing up in dies two identical web-and-hub members, placing them back to back within an annular rim-member, and simultaneously compressing the latter in dies to render it cylindrical and expanding the webs of said web-and-hub members to cause the edges of said webs to bite into the metal of said rim-member.

2. The method of making a metal wheel of the class described, which consists in pressing up in dies two identical web-and-hub members, placing them together with the axes of their hub-portions in alinement, and within a tapered, annular rim-member, and compressing the latter in dies to render it cylindrical and to cause the edges of the web-portions of said web-and-hub members to bite into the metal of said rim-member.

3. The method of making a metal wheel of the class described; which consists in cutting out and pressing up in dies two identical web-and-hub members, placing them together with the axes of their hub-portions in alinement and with the sharp, sheared edges of the web portions towards the outside, and compressing a soft steel rim onto said edges.

4. The method of making a wheel of the class described, which consists in placing two identical sheet-metal web-and-hub members within a rim-member, and simultaneously compressing said rim-member onto the web-portions of said web-and-hub members and expanding said web-portions into said rim-member.

5. The method of making a metal wheel which consists in cutting from sheet steel two circular web members, placing them back to back with the sharp peripheral edges on the outside, and forcing said edges into the metal of an annular rim member.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ANDERS G. ANDERSON.

Witnesses:
ELLENTON W. WARD,
PRESCOTT C. WHITE.